# CHAPTER 4

# OTHER EXAMPLES OF STREET STORAGE SYSTEMS

## Purpose

Using the well established and on-going Skokie and Wilmette, IL project; the previous chapter presents a proven and practical street storage system concept through construction and operation and maintenance process. Provided in this chapter of the manual, are synopses of other street storage studies, designs and implementation. The intent is to use other examples as supplemental, mini-case studies which provide additional insight into street storage. Some of the additional examples were carried through to implementation while other did not move or have not yet moved past the feasibility stage. Nevertheless, each of the mini-case studies offers additional useful ideas and information that may be useful to municipal officials.

In the early 1980's, near the beginning of the Skokie project, Donohue and Associates personnel learned much about flow regulators from other communities. For example, research revealed that vortex regulators had been installed in at least a dozen Canadian and U.S. communities. Contacts were made with municipal personnel in six communities that had vortex regulator experience. Donohue personnel also communicated with Canadian and U.S. communities about their experience with other types of flow regulators (Donohue, 1984a, pp. 3-3 to 3-13).

Missing, at that time, were completed, or largely completed, street storage systems that included flow regulators, berms, surface and subsurface storage. The Skokie and Wilmette case studies in the previous chapter provide examples of largely completed street storage systems. This chapter's synopses of other projects which are, in effect, street storage systems, provide additional examples.

## Cleveland, OH: Puritas Avenue - Rock River Drive Area

### *Background*

This mid 1980's investigation was undertaken primarily to "...evaluate the ability of the Hydro-Brake to effectively regulate specific design flows from stormwater storage structures to such an extent that receiving sewers could be protected from surcharging and creating CSO conditions" (Mathews et al., 1983, p. 2, see also Mathews et. al., 1984). Although the study focused on the Hydro-Brake, one of the commercially available flow regulators discussed earlier in Chapter 3, the study does provide insight into the street storage system.

The overall combined sewer study area covered 115 acres of medium density residential originally developed in the 1920's. Basement flooding caused by surcharging of combined sewers was a problem. Within this area, three subsurface tanks were constructed serving separate subareas having a total area of 9.0 acres (Mathews et al., 1983, p. 2). The three tanks were located within the street curb lines and above the combined sewers, that is, they were intended to be gravity devices and to temporarily store stormwater runoff. The three tanks were constructed of corrugated metal pipe (CMP). The first tank used 163 feet of 48 inch diameter CMP and provided 2000 cubic feet of storage. The second tank was formed from two parallel 87 by 63 inch corrugated metal arch pipes each 156 feet long for a total storage volume of 10,000 cubic feet. The third tank consisted of 170 feet of 95 by 67 inch corrugated metal arch pipe and contained 5,800 cubic feet of storage. Inlets conveyed stormwater to the subsurface tanks and flow regulators controlled flow out of the tanks (Mathews et al., 1983, pp. 12-15).

The study included:

- Filling and draining each tank to determine Hydro-Brake stage-discharge relationships.
- Monitoring of precipitation, water levels in tanks, and stormwater quality.
- Simulation of tank inflow and outflow hydrographs for design storms of prescribed recurrence intervals.
- Pre and post-construction surveys of area residents with emphasis on basement flooding.

### *Results*

Numerous findings were reported. Some of the more significant observations relative to this manual are (Mathews et. al., 1984):

*Hydro-Brake regulated storage tanks are effective in alleviating sewer surcharge and basement flooding problems.*

*By reducing the peak flow in the sewer system, combined overflow pollutant loadings are reduced because the first flush effect is dampened.*

*For effective application of the Hydro-Brake regulated technology, the design approach must include accurate characterization of drainage areas and sewer hydraulics to properly identify site-specific release rate requirements. The level of control desired determines the required storage volume, and the characteristics of the site determine whether to employ above-grade or below-grade storage, or a combination thereof.*

*Where surface ponding is an acceptable form of stormwater storage, the application of Hydro-Brakes alone is more cost-effective than Hydro-Brakes used in conjunction with off-line, below-grade storage structures. Both applications, however, appear to be more cost-effective than the other evaluated alternatives where both surcharging and overflows are the prevailing problems.*

*During the first 18 months of operation, the Hydro-Brake control/detention structures exhibited minimal maintenance requirements. Solids deposition in the storage tanks was negligible and did not increase significantly with time.*

Potentially useful ideas and information drawn from this Cleveland, OH project include:

- Use of CMP for subsurface tanks.
- Reduction of the first flush effect.

- Desirability, from a cost perspective, of using on-street storage rather than below-street storage.

- The likely cost-effectiveness and multiple purpose benefits (reducing basement flooding and CSO's) of a street storage system.

**Parma, OH: Ridge Road Area**

***Background***

Ridge Road area "...is a topographic "dished" shaped area (30 acres) situated within the lower portion of a 290 acre drainage system. The terrain in the watershed is hilly with deep valleys..." (Pisano, 1989). The 290 acre area is highly developed in that it contains 1200 homes and many commercial buildings. An over/under sewer system serves the area. This is a special form of a combined sewer system common throughout the Cleveland metropolitan area. The storm sewer is laid immediately above the typically smaller diameter sanitary sewer. The two sewers share the same trench and manholes and, therefore, there is a high likelihood of flow between the two conduits..

As explained by Pisano (1989), the 30 acre area, known as the Triangle:

> *...endured severe basement flooding resulting from the surcharging sanitary sewers during heavy rainstorms (at least three to four episodes per year). The cause of surcharge stems from the undersized storm systems which cannot handle storm flows, [they] pressurize, surcharge and leak significant amounts of clear water into the rock filled "french drains" trench section. Since the sewer joints in the sanitary sewer are invariably cracked or broken, the surcharge condition within the rock filled trench adversely affects the sanitary sewer piping, ultimately resulting in basement flooding. Basement flooding in the Triangle is further exacerbated by the poor hydraulic outlet conditions of the local sanitary systems...*
>
> Due to the rolling terrain, there are numerous "low valley pockets" throughout the entire 290 acre area. The storm drains are generally inadequate. Surface water which cannot

escape via major overload routes...
accumulates and severe street flooding results.

Therefore, the 290 acre drainage basin, and especially the Triangle, experienced frequent and simultaneous basement and street flooding. The problems needed to be solved.

### *Results*

One partial solution was "...to construct a large underground off-line detention basin for relieving the sanitary trunk sewer coming into the study area and to construct sanitary relief sewers throughout the Triangle." This $2,200,000 project (mid 1980's costs) would solve only the basement flooding problem. The surface flooding problem would remain.

The alternative, which was implemented, is what is referred to in this manual as a street storage system. The system includes downspout disconnection, berms, reconstructed curbs, flow regulators, new catch basins, subsurface storage tanks, manhole rehabilitation, and relief sewers. Construction costs in 1984 totaled $875,000 (or about $3000 per acre in 1984 dollars) which is 40% of the cost of the partial solution.

According to Pisano (1989), "The project has mitigated surface water ponding and has provided basement flooding protection throughout the entire 290 acre area... Although not intended, spring sanitary sewer infiltration has been significantly reduced."

Possible valuable ideas and information based on the Parma, OH project are:

- Potential applicability of the street storage system to hilly terrain.
- Use of the street storage system to simultaneously mitigate basement and surface flooding.
- Cost effectiveness of the street storage system approach.

## Chicago, IL: Jeffery Manor Neighborhood

### *Background*

Jeffery Manor is a 470 acre CSS area on the southeast part of the City of Chicago. Residential land use dominates with commercial, industrial and undeveloped land on the perimeter. Streets have curb and gutter, are paved and most have sidewalks and tree lined parkways. Local combined sewers, owned by the City of Chicago, range from 10 to 42 inches in diameter, and discharge to MWRDGC interceptor sewers. The entire area is very flat (SEC Donohue, 1993).

Jeffery Manor has a serious basement flooding problem caused by surcharging of the CSS. Local and interceptor sewers do not have the capacity needed to carry flows received during rainfall events. An additional exacerbating factor is excessive dry weather flow in interceptor sewers that originate outside of and flow through Jeffery Manor. Sewer crowns are about eight feet below street level and most basement floors are five to six feet below street level. Therefore, a few feet of surcharging above sewer crowns forces combined sewage into basements.

### *Results*

Results of the feasibility study, as quoted (parenthetic comments added) from SEC Donohue (1993, pp. 1-1 to 1-2) are:

> *...a temporary street storage system would alleviate sewer surcharging in the Jeffery Manor area caused by overloading of the local collection system. The system was developed under the assumption of greatly reduced flows in the MWRDGC interceptor sewer entering the Jeffery Manor area. This reduction in flow will occur when tunnels or other relief sewer projects are constructed. However, if flows in the MWRDGC interceptor continue at current levels, the proposed street storage system will provide some relief to the existing flooding problem, but will not perform to its maximum capability.*
>
> *The analysis for the five-year storm event showed that the storage required to eliminate sewer surcharging is 455, 280 cubic feet (970 cubic feet per acre). The proposed temporary street ponding system entails development of ponding areas on 74 city blocks ...to provide 328,570 cubic feet of storage. The ponded stormwater would be held in place by 120 berms to be constructed across the streets (See Figure 4-1). Construction required for*

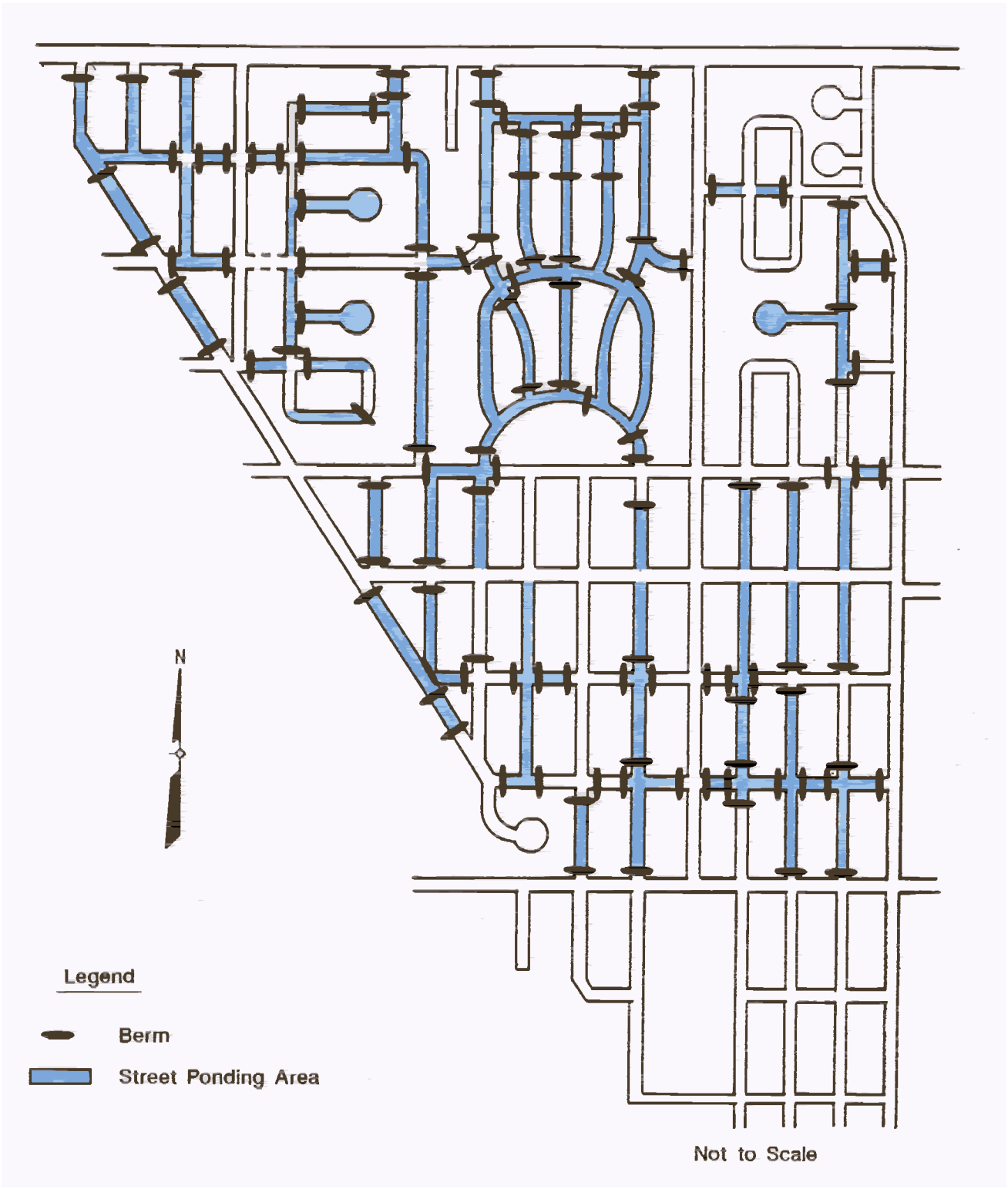


**Figure 4-1.** Street storage system proposed for the Jeffery Manor neighborhood in Chicago, IL (Source: SEC Donohue, 1993, p. 5-3).

*implementation consists of berm construction, removal of existing stormwater inlets and installation of new inlets with flow restrictors.*

*The estimated construction cost for the street storage components is $1,860,000 (or $3960 per acre in 1993 dollars).*

*Although temporary ponding alone will greatly improve the system capacity in Jeffery Manor, additional facilities are required to provide a full five-year level of protection. Approximately 60,000 cubic feet of additional storage is needed in the southern part of the neighborhood... This storage could possibly be provided on the property of a closed elementary school... Also a relief sewer is needed... To provide a five-year level of protection for the area after flows in the MWRDGC interceptor are reduced by other projects, street ponding, other storage and a relief sewer are required at a probable construction cost of $2,481,600 (or $5280 per acre in 1993 dollars)... Street storage reduces the required capacity of relief sewers, and can result in millions of dollars in savings for construction of sewers.*

The recommended project has not been implemented. Possibly useful ideas and information drawn from the Jeffery Manor feasibility study are:

- The need to address interceptor sewer capacity as affected by contributions from outside of the CSS area.

- Cost effectiveness of the street storage system approach.

# CHAPTER 5

# REGULATORY AND FINANCIAL FRAMEWORK: COMPLYING WITH REGULATIONS AND FUNDING CONSTRUCTION

## Motivated by Need But Subject to Regulatory and Financial Constraints and Opportunities

The principal reason to undertake the street storage projects in the communities of Skokie and Wilmette, IL was to solve the serious problems of widespread flooding of basements by combined sewage. Skokie and Wilmette had flooding problems that had grown and festered long enough and the time for action had arrived, regardless of regulatory requirements.

This stands in stark contrast to the situation in many CSS communities where projects are planned and implemented primarily to comply with regulations and court, administrative or consent orders intended to prevent pollution of receiving waters. The fundamental challenge in Skokie and Wilmette was to take basement flooding, a serious, widely shared local concern, and come up with an affordable alternative to the proposed unaffordable relief sewers.

The initial objective in Skokie and Wilmette was to create a project that solved several problems and package the project in such a way that it:

- Eliminated basement flooding
- Was compatible with MWRDGC policy
- Was affordable to the community
- Was supported by residents and users
- Was supported by state agencies which control NPDES compliance
- Might be eligible for outside capital agency funding.

With these objectives in mind, planning, design and construction could not proceed in a vacuum. Many challenges had to be met, not the least of which were regulatory requirements and related legal matters and the means by which construction would be financed to make the improvements affordable. Some of the regulatory framework

proved to be advantageous in that it offered opportunities to pursue certain funding options.

Regulatory and financial issues are discussed together in this chapter because they are highly interrelated. For example:

- Federal and state regulations sometimes define a community's eligibility for external funding in the form of loans and grants.

- Past state and federal funding programs required ties to NPDES compliance and schedules of implementation for identified construction projects. In the case of Skokie and Wilmette, both projects were originally expected to construct large relief sewers to flow into TARP. TARP was grant eligible and the large relief sewers were not.

- Working through the wastewater and stormwater permitting process brings together local, regional, state and federal agency personnel. This connection expands the local communities access to unique project technical solutions as well as access to alternative funding sources.

- Home rule jurisdiction, as defined by Illinois law, meant that Skokie's elected and appointed officials did not have to get new voter approval on some local borrowing. However, in the case of Skokie and Wilmette, focusing on basement flooding elimination made proceeding with the project easier at the local level.

- Should the agency permitting process result in the creation of an unaffordable project solution, the agency permitting staff themselves become advocates for special funding. That special funding can come from a change in program eligibilities or direct legislative appropriations.

Other crucial issues, such as analysis and design procedures, public involvement, and inspection and maintenance are discussed in, respectively, Chapters 3, 6, and 7.

The next three major sections of this chapter focus primarily on complying with federal and state regulations and obtaining funding through federal and state programs. Sources for these sections are Roecker (1993, 1997, 1998a, and 1998b) plus additional sources cited within these sections.

**Federal and State Regulatory and Funding Framework Within Which Skokie and Wilmette Functioned**

During the late 1970's, the Skokie and Wilmette combined sewer systems were expected to be reconstructed and connected to the future Chicago TARP project. A CWA Section 201 Facility Plan was prepared for both Skokie and Wilmette which showed the cost of combined sewer correction program, consisting of large relief sewers, to be very expensive. In the case of Skokie, the estimate was $100,000,000 based on 1980 dollars. Because of TARP's need for construction capital and the MWRDGC's ability to win USEPA Construction Grant eligibility for the TARP project, Skokie, Wilmette and all other MWRDGC contract communities combined sewer separation projects were classified as ineligible for grant monies.

This ineligibility determination and the continued basement flooding stalled remedial action in Skokie and Wilmette until affordable alternatives could be developed. In the early 1980's, Skokie began looking for alternatives to the construction of relief sewers. Working with their engineering firm, they began looking at their challenge in terms of a stormwater management problem, rather than a relief sewer problem. This process resulted in the creation of the Skokie street storage system approach.

Meetings were held at the state to review the concept and determine how Skokie and the state could create a partnership. The partnership was necessary to change the regulatory requirements associated with the existing CWA Section 201 Facility Plan and to try to find a way to change or eliminate current funding ineligibility determinations. Initial meetings with the state focused on the following;

- Change the regulatory requirements associated with the previously approved CWA Section 201 Facility Plan to eliminate NPDES compliance issues associated with eliminating the relief sewers.

- Look for local, state or federal funding sources which could assist in demonstrating the new technologies or lower local cost impacts.

- Look for state level project support which would later help bring in other state and federal agency funding.

Today, the path cut by Skokie and followed by Wilmette, is different. The differences can be characterized as follows and can be used by others to assess the regulatory and financial process;

- The initial regulatory challenge facing Skokie and Wilmette related to TARP using all available USEPA Construction Grant dollars for their project and leaving the two communities with an NPDES requirement to build expensive relief sewers with no access to grant or low interest loan money. Today, large percentage grants are not available to projects like TARP and, therefore, communities are forced to focus on alternative, lower cost and smarter projects at their initial stages of project planning.
- The USEPA Construction Grants program has been replaced with the

USEPA State Revolving Fund (SRF) program. In general, this program provides low interest loans which must be paid back by the communities. A new sense of fiscal responsibility has entered projects which has resulted in longer term phased projects that become more affordable to the users.

- Demonstration projects, like Skokie and Wilmette, have become showcases of what stormwater management can accomplish in CSS and how it can save costs. More alternative technologies are becoming available to those who seek them.

- At the national level, the U.S. Congress has begun providing direct grant assistance to those projects which can demonstrate unique qualities or have unique characteristics. Most recently, successful projects tend to deal with the large issue of "watersheds" as opposed to single issue wastewater or stormwater challenges. The Skokie and Wilmette projects provide good examples of a multi purpose, watershed-based approach.

## Today's Regulatory and Funding Framework: Review of Outside Capital Funding Programs, Techniques and Strategies

### *Overview*

Since the 1950's, the U.S. Congress has provided capital funding for municipal water related infrastructure. The capital funding assistance has ranged from full project grants to subsidized long term loans. In the recent past, communities and authorities have found that their water related projects have become more expensive and government funding has diminished.

Based on recent Congressional actions, the future of state and federal sponsored water related funding programs and initiatives are becoming known. That future includes continued capital water related project funding opportunities for those communities and projects that meet the criteria of a changing funding landscape.

Ideas, suggestions and insights contained in this chapter provide the tools needed by communities to win needed capital water related funding. Addressed here is the movement of available local, state and federal funds through existing and proposed water related funding programs. Presented is information on the location of both traditional and nontraditional funding opportunities. Communities are encouraged to expand their water related project objectives to match the funding program objectives. Both state and federal funding program objectives are highlighted in this chapter to give community leaders important strategic information that can save time in review of possible funding avenues.

### *Outside Capital Funding from Users*

The creative use of "special assessments" and "developer funds" offer unique capital funding opportunities. Use of both "special assessments" and "developer funds" can accomplish the following:

- The ability to assess acreage that is receiving a benefit from an area-wide project. In the case of an urban stormwater project, area-wide benefit can easily be defined and assessed on a more uniform basis than the traditional per-foot basis.

- The ability to assess the capacity of a storage or treatment facility to all users of the facilities on a uniform basis.

- Since "special assessments" are property liens, federal agencies are available to pay the assessments for the poor and elderly. Programs continue to provide monies for these special user groups to make the improvements affordable.

- Including the needs of developers as a project planning objective can enhance the project's usefulness, and bring a secondary benefit of outside funding from the developer. Long term phased projects tend to have the time available to search out these developers and negotiate reasonable financial contributions which benefit the developer and the community.

In the past several years, there is increased concern with making sure that all project "stakeholders" are paying their fair share. In developing an outside capital funding strategy, community leaders should make sure that all those benefitting or those who will benefit are accounted for.

***Outside Capital Funding from State and Federal Agencies***

In order to understand what agency funds are available, a community must learn why a agency provides funding. The following five points were developed from experience and provide some insights:

- Funding agencies fund their program objectives, not a community's project

- A community should develop its project's uniqueness during planning

- Keep working with the agency until someone says "maybe"

- Once funding is obtained, other agencies will follow

- Spend some time getting to know representatives of agencies

To reiterate, of all the issues that are important to winning outside capital funding, the single most important issue is understanding the funding program objective. As community leaders start thinking about outside agency funding, they should define how

their project will help the agency further its objectives.

The following list of funding programs contain current (1999) information regarding their objective, funding, administration, and current program status. These programs provide more than 90% of water related infrastructure funding throughout the country.

# U.S. Department of Agriculture (USDA), Rural Utilities Service (RUS) & Rural Housing Service (RHS).

Objective: To provide safe and sanitary housing, including water related facilities to small, rural municipalities ( less than 10,000 pop.) serving lower income persons.

Funding: FY 1999 funding levels were $763,977,000 in low interest loans and $500,000,000 in direct grants for project costs and $25,000,000 in direct loans and $25,000,000 in direct grants to low income elderly rural home owners for special assessments.

Administration: Through a federal agency state headquarters office and several district offices. The district offices review, screen and recommend individual projects to the state office. If the state allocation is committed, a state can submit a project to a national office for special funding consideration.

Status: These programs continue to receive increased funding. The district staff engineers provide a very detailed review of proposed infrastructure and work to lower capital costs and limit eligibilities on each project.

# U.S. Department of Housing & Urban Development Block Grant Program (HUD).

Objective: To provide viable urban communities with decent housing, a suitable living environment and expanding economic opportunities for low to moderate income residents.

Funding: FY 1999 set funding levels of $3,103,100,000 for their large community entitlement program and $62,222,000 for their small community block grant program.

Administration: Through a state agency normally located in the state capital.

Status: Past historic influence by Congress is said to have ended. Entitlement recipients tend to receive small allotments that are spread over numerous competing infrastructure needs with little money available for new water related infrastructure, while the state-wide small community competition tends to provide a more meaningful opportunity for water related funding.

# U.S. Department of Commerce Economic Development Administration (EDA).

Objective: To promote long-term economic development and assist in the construction of infrastructure, including water related facilities, needed to initiate and encourage the creation or retention of permanent jobs

Funding: FY 1999 saw program funding of $160,000,000 for this program.

Administration: Through a federal agency headquartered in the federal regional city with a very small state or multi state office. In addition, individual states also have their own version of this job creation program that can provide direct state assistance to worthy projects.

Status: While EDA was slated for termination by the 104th Congress, it remains intact. Before funding water related infrastructure, EDA will want very detailed information from the job creator and limits funding to projects that generally cost less than $10,000 per permanent job created.

# U.S. Environmental Protection Agency (USEPA).

Objective: To provide financial incentives to communities to obtain and maintain NPDES compliance and provide a long term source of financing for water related infrastructure.

Funding: FY 1999 saw program funding of $2,125,000,000 for their water related State Revolving Loan programs with additional grant monies available from the USEPA Budget itself.

Administration: Through a federal agency headquartered in the federal regional city with direct allocation of loan and grant monies to individual state pollution control agencies.

Status: The State Revolving Fund programs are viable funding programs and are beginning to expand eligibilities for watershed projects. Reauthorization of the Clean Water Act was pending as of early 1999. However, the reauthorization is expected to further expansion of the eligibilities to innovative watershed programs that meet the objectives of pollution reduction together with flood protection.

In addition to the USEPA's State Revolving Fund program several areas of the U.S. Budget contain demonstration and implementation funding programs that can provide grant assistance to projects that meet the specific funding objective contained in that particular section. The USEPA (1993, EPA-814) provides the list of funding sources which follows. Note: Section numbers refer to the Section of the existing Clean Water Act and the numbers in parentheses refers to the funding program as described by the Executive Office of the President and U.S. General Services Administration (U. S. GSA, 1998).

- Section 106 (66.419): This program provided state and interstate agencies and Indian tribes with more than $115,000,000 in 1999 for prevention and abatement of surface and groundwater pollution.

- Section 604(b) (66.454): This program provided States with $12,000,000 in 1999 to carry out water quality management planning.

- Section 603(d) (66.458): This program provides States with up to 4% of their State Revolving Fund (SRF) allocation to manage their programs. Nationally this amounts to more than $80 million annually, and if the State's SRF program involves water resource projects, the administration of these water resource projects can come from this fund.

- Section 319(h) (66.460): This program provided $200,000,000 in 1999 to State-designated lead non-point source (NPS) agencies to fund implementation or construction of water resource related practices or infrastructure. The 1999 federal allocation represents a 100% increase over 1998.

- Section 320(g) (66.456): This program provided $12,300,000 in 1999 to any agency or individual for planning activities in designated estuaries.

- Section 104(b)(3) (66.463): This program provided $19,000,000 in 1999 to any agency or individual for one to two year demonstration type projects, including combined sewer overflow and stormwater discharge control programs.

- Regional Initiatives: The USEPA regions spend in the area of $2 to $4 million annually on projects that address watershed protection. Communities can obtain a listing of current objectives from their regional USEPA office.

Working through these federal agencies and their state counterparts will provide community leaders with an understanding of the administrative funding possibilities for both current and future water related projects. In addition, the effort will produce the background information needed by a community to consider taking their project to the next step in the funding road. That step is the U.S. Congress.

### *Outside Capital Funding from the U.S. Congress: Direct Legislation*

Over the past several years, a growing number of communities have sought direct funding of their projects from Congress through the U.S. Congress' appropriations process. In addition, various State Legislatures have begun providing direct funding of special and unique projects.

Since 1992, the U.S. Congress has provided $3,579,425,000 in direct grants for water, watershed, groundwater and wastewater projects across the nation. If a community works through the existing local, state and federal agency funding programs and the project is still truly unaffordable or if it has some unique feature that distinguishes it from other projects attempting to accomplish the same objectives, elected officials can help.

Certain projects may fall through the cracks either by poor management or circumstances beyond their control. The U. S. democratic process has a strong sense of fairness and when a case can be made demonstrating that the project has not had a fair shake for available public funds, both the state and federal legislatures can help.

Special attention to the issues of the day and the concept of "fairness" leads to success in the legislative arena. When dealing with its legislature, community leaders should keep the following objectives in mind:

- Legislatures provide direct funding to win favor with large population areas for future political purposes by correcting an actual or perceived public policy injustice and removing unreasonable regulatory barriers which preclude sound projects from proceeding.

- Legislatures provide direct funding to correct actual or perceived public policy injustices for a project which would have been eligible for significant grant funds in the past and was delayed beyond the control of the community.

As can be seen from a review of these two concepts, the key is to have spent the time to review all funding options and have a project packaged to the point that congressional funding is the last, but potentially promising resort. Using the information provided in this chapter as an overall checklist for local, state, and federal agency funding opportunities will serve communities well in covering the “other funding” bases. Spending appropriate time to prepare a well written, concise project history, scope and objectives document will serve to focus a community’s project objective. The community, its engineer, and state and congressional representatives should be involved in the packaging process.

Below is a checklist of items to review before a community goes to the U.S. Congress with its project. Community leaders should remember that they are looking to get their representative's attention and have their project meet the objectives of the current line item funding written and unwritten criteria.

I. Project factors to be completed before taking a project to U.S. Congress

A. Past site, environmental, and water quality issues addressed
   1. The project is planned and on its way to being designed.
   2. The community has reviewed other funding and understands why it is not available.

3. The state has supported the project in writing and has given it high priority.

B. Past agency issues have been addressed
   1. The community addressed state concerns raised during the planning process.
   2. The community has or is continuing to work to secure all project permits.

C. The project is packaged
   1. Unique project qualities have been determined.
   2. The community knows all its lost opportunities for funding and the reasons.
   3. The community has a well written one to two page summary describing the project and needs.
   4. Parallels to past congressionally funded projects have been developed by the community.
   5. The project's objectives have been packaged in a user-friendly format.

II. Recommended Washington-based activities

A. Develop the right team to present and monitor congressional actions
   1. Set up a team representing the community that includes:
      State congressional delegation representative
      Local elected representative
      Governor's office
      Project owner's staff
      Consulting engineer
      Governmental affairs manager or consultant.
   2. Make specific assignments to team members.

B. Make sure that the team understands the project and its objectives.

C. Meet with and/or communicate frequently with the community's congressional delegation

D. Use the team's past experience to create new relationships with influential congressional leaders, appropriate committee members and staff

E. Monitor the schedule of both the authorizing and appropriations committees

F. Develop, manage, and communicate with project team members frequently

G. Make responding to questions, inquiries, or requests a high priority

III. When a community "wins" funding

A. Make sure that the entire congressional delegation gets credit
B. Work with the appropriate funding agency in the grant release process
    1. That agency has control over grant percentages, the application or non-application of rules, regulations, and program guidance.
    2. Most funding agencies burdened with the grant release process are understaffed and need community technical assistance to move quickly.
    3. Be willing to share a small portion of the grant to cover necessary funding of agency administrative costs of grant administration.
    4. Keep very accurate records during the project because federal audits are likely years after the project is complete.

**Initial Capital Funding for the Skokie Street Storage System**

As discussed earlier in this chapter, Skokie's initial capital funding plan had the following two objectives:

- Lessen the cost or eliminate the need to construct the $100,000,000 relief sewer system that was recommenced by its existing CWA Section 201 Facility Plan.

- Develop an innovative technical alternative to the relief sewers, work with State and Federal agencies to win approval and secure some outside funding to make the alternative affordable.

Skokie began work with the regional consulting engineering firm Donohue and Associates, Inc., of Milwaukee, WI (now Earth Tech, with corporate offices in Long Beach, CA), who developed the innovative street storage system. Once this system was documented in a feasibility study and the estimated capital cost was shown to be only a quarter to a third of the cost of the relief sewers, Skokie called a meeting with the State of Illinois.

The state was impressed with the technical approach and quickly realized that this innovative technical alternative could be applied to other communities in the area and result in a significant lowering of capital infrastructure cost. With this being the case, the state became a partner in the project and began working with Skokie to find ways to assist with making the project a reality.

While the USEPA's Construction Grants Program specifically made the relief sewer alternative an ineligible project, the state had begun work on the new USEPA State Revolving Loan Program which allowed the State more flexibility in making eligibility decisions. After reviewing the water quality impacts and evaluating the technical merits of the project, the state made the project and technology eligible for its low interest loan program. Low interest loans were important catalysts in both the Skokie and Wilmette

street storage projects.

The new funding program was entitled the “State of Illinois Water Pollution Control Revolving Fund” (WPCRF). At its inception, it offered communities 20 year loan rates equal to one-half the interest rate for which the State of Illinois could borrow monies.

Once Skokie began the project, it recognized that expanding the project objectives and building a partnership with the state helped bring in outside capital to lower the cost of the project and create a new project partner. This process was continued with the State of Illinois Department of Transportation (IDOT). Skokie had a need to build street storage infrastructure in and near to IDOT facilities. Working with IDOT and demonstrating the positive impact of the street storage project on their facilities resulted in the Village’s receipt of additional direct grant dollars from the IDOT’s own funding programs. Another phase of Skokie’s partnership with the state is grants received under the Build Illinois program.

In the fourteen years Skokie has continued with the project, they have used a combination of SRF loan monies, direct grant monies from the State of Illinois Department Transportation, Build Illinois grants, and General Obligation local bond monies to bring the project to where it is today. A general breakdown of these four funding sources, is as follows:

- Water Pollution Control Revolving Fund = $18,700,000
- IDOT grants = 1,100,000
- Build Illinois grant = 500,000
- General Obligation bonding = 56,000,000
- Total $76,300,000

**On-Going Local Capital Funding of the Skokie Street Storage System Through the Bond Market**

Fishman (1998) reviewed the history of the Skokie street storage project with emphasis on how it was financed on the local, non-agency front. As the project neared completion in 1998, Fishman’s paper provides a contemporary, insightful, outsider’s view of the systematic, prudent and persistent process followed by community leaders to use the municipal bond market to finance project costs outside of agency funding sources. The paper reviews the advantages of the phased implementation of the system over an approximately 14 year period and provides insights into the marketability and the investors desire to purchase municipal bonds for projects such as this.

Even though the cumulative capital cost of the innovative street storage system was to

be only about one-third the cost of more traditional sewer separation approaches, this was the most expensive project ever undertaken by the community. Skokie faced a great financial challenge.

From the outset, according to Fishman (1998, p. 181), Skokie enjoyed at least two project financing advantages. First, the community had a high credit rating so that bond issues typically drew multiple bidders. This yielded favorable interest rates. Second, as an Illinois home-rule community, the community leaders did not have to get voter approval for general obligation bonding.

As part of the street storage financing process, the community retained an individual financial advisor. According to Fishman (1998, p. 182), the financial advisor's responsibility was:

> *...to structure bond offerings on behalf of issues so that they are legal and fair, as well as attractive to both investors and dealers. Then, at a pre-set time and under terms put forth in his offering documents, he invites would-be dealers to bid on the issue.*

Moody's Investors Service was retained by Skokie to determine the community's financial health. This is where the new and innovative nature of the street storage system could have affected the capital financing process. Fishman (1998, p. 182) explains that the soundness of any particular project in a community usually doesn't affect the financial health assessment conducted by Moody's and other rating agencies:

> *...but in Skokie's case, the review would have to account for the largely experimental and expensive technology involved in the project. ...Moody's even made a few house calls to get a feel for the intangibles that might not be captured by the town's financials.*

Apparently the "experimental" technology passed muster. Skokie funded the capital cost of the project largely with a series of eight general-obligation bonds, the first of which was issued in 1985. A total of $56 million was borrowed at interest rates ranging from 4.5 to 7.2 percent. In 1998, Skokie:

> *...completed the last round of borrowing. Seven bidders sought to issue bonds, and Skokie got the lowest interest rates since the project began over a decade ago (Fishman, 1998, p. 185).*

**Skokie Downspout Disconnection Ordinance and Program**

As suggested in the preceding sections of this chapter, federal and state regulations often require that a community undertake costly projects. On the positive side, these regulations also provide the creative, proactive community with opportunities for outside funding.

While a community has little if any control over state and federal regulations, it does have overall control over the creation and enforcement of local regulations. Skokie created and enforced a special local regulation to successfully implement downspout disconnection, the first concrete step in its program to mitigate basement flooding caused by surcharging of combined sewers. Described here is the community's systematic program, which started with information gathering and education, ended with strict enforcements, and resulted in the disconnection of essentially all downspouts. Portions of Skokie's approach may be useful to other communities.

### *The Downspout Problem*

As shown in Figure 5-1, when downspouts are connected to the house sewer, they permit roof water to directly and immediately enter the CSS. This aggravates combined sewer surcharging and basement flooding problems.

### *The Downspout Solution*

The adverse effects of directly connected downspouts can be partly mitigated by disconnection the downspouts at ground level and directing their outlets toward landscaped areas. A photograph of a disconnected downspout is provided as Figure 5-2.

Paintal (1981), in his study of Skokie's ESSD, concluded that "for short duration storms the disconnection of downspouts from the sewer system reduces the flow in the sewer significantly if the flow from the downspouts is directed to lawns and other porous areas." Skokie's 1974 study of a pilot area concluded that downspout disconnection would substantially reduce the hydraulic load on the combined sewer system.

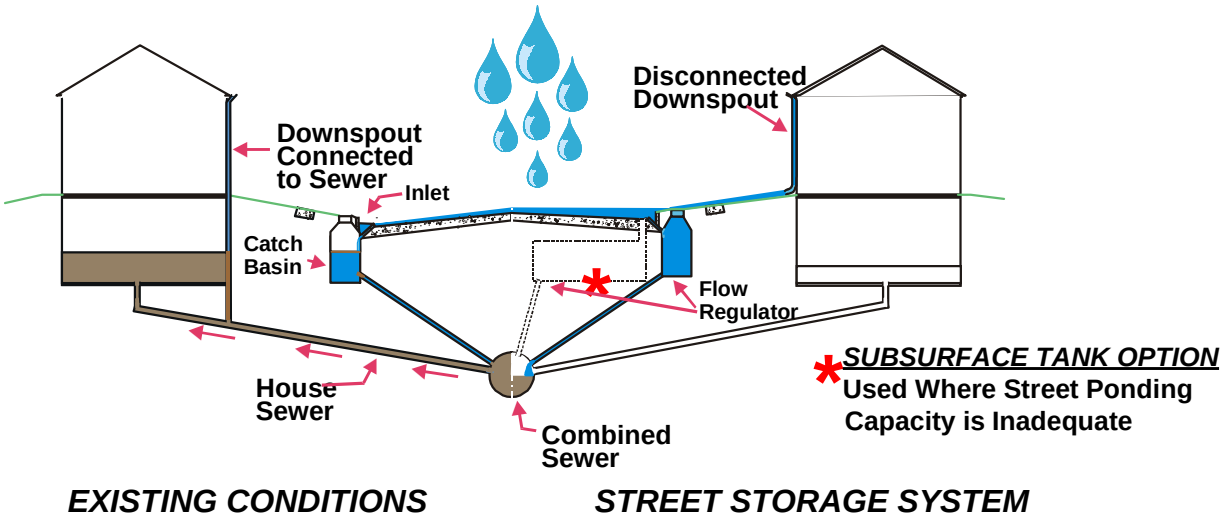


**Figure 5-1.** Downspouts connected to the house sewer, as shown on the left side, permit roof water to directly and immediately enter the combined sewer system and increase surcharging.

**Figure 5-2.** A disconnected downspout.

### *Educational Value*

Even if downspout disconnection does not achieve a major reduction in the load on a combined sewer system, it can have a positive community-wide educational effect. Success of a downspout disconnection program requires participation, that is, specific action, by essentially all property owners. Accordingly, they are likely to gain additional understanding of the cause and effect relationship between stormwater runoff and surcharging of the CSS. Armed with this knowledge, citizens are more likely to understand the need for and give support to other much more costly components of a street storage system. Examples of those other components are berms, flow regulators, and underground tanks.

### *Downspout Disconnection Process Used in Skokie*

This description is based on a paper by Walesh and Schoeffman (1984) which was presented near the end of the disconnection program. The Skokie program began in a regulatory manner with the September 1981 passage by the Board of Trustees of an ordinance requiring the disconnection of all downspouts on one and two family residences.

However, the initial strategy was to gather information and encourage volunteer action, rather than emphasize enforcement. Questionnaires were sent to every involved residence. This questionnaire set the groundwork for the subsequent two year implementation effort. Residents were asked if their downspouts were already disconnected, whether they needed assistance or advice, and whether they felt that special circumstances made them eligible for an exception from the ordinance.

Based on the response from this survey, Skokie personnel began a comprehensive program of assistance and inspection to determine where exceptions could be granted and to find where compliance had been achieved. The initial inspection effort found that volunteer action in response to previous recommendations to disconnect downspouts had resulted in almost 50% compliance with the ordinance before its passage.

In order to make the program manageable, residential areas of the community were broken down into 21 housing districts, each containing approximately 700 residences and covering an area of approximately one-half square mile. Each housing district was dealt with separately and given a specific compliance date. Owners or occupants of residences determined through inspection to be violating the ordinance were notified by letter of the compliance date for their district. After expiration of the compliance date, another inspection was made and a “warning citation” left at the residence by the inspector. Two weeks after this warning, a final letter was sent to all non-complying residents and citations requiring court appearances were issued.

For a two year period, except during winter months, this process continued. At the conclusion of the program, 99.9% compliance was achieved in that all but 18 residences out of the total of almost 14,000 satisfied the requirements. A total of 169 citations were issued requiring court action and 19 judgments of up to $500 were entered by the court.

A review of the small number of exceptions granted under the ordinance indicates that more than 90% of the roof water from one and two family homes in Skokie were disconnected from the sewer systems. One reason for this small number of exceptions is the specific criteria used to evaluate the need for an exception. Exceptions were granted only if the downspout water could not be directed to a location where it would drain away from all building structures with the use of an extension up to ten feet long or where a necessary downspout extension would block a sidewalk or driveway.

**Skokie Stormwater Control Ordinance**

As explained by Donohue (1987a, p. 3-2):

> *Skokie adopted a stormwater control ordinance in August 1977. This ordinance requires that all new development limit the peak runoff rate from the site to that of an undeveloped 2-year frequency storm (C = 0.15). Excess stormwater runoff, as determined by the difference between the stormwater runoff from the undeveloped area with a 2-year storm and from the developed area with a 100-year storm, shall be stored onsite in a stormwater retention or detention facility.*
> *All development that existed prior to the effective date of the ordinance was exempt from the stormwater control requirement except certain off-street parking facilities and developments that are destroyed or improved by greater than 50 percent of the original value of the structure before such damages were incurred or improvements were made. The ordinance also outlines minimum design and construction criteria for onsite stormwater retention/detention facilities and discusses maintenance, administration, and enforcement.*

This ordinance focuses primarily on new development but also applied to redevelopment. Given that Skokie is essentially fully developed, as are many CSS areas or communities, stormwater ordinances intended to prevent increased runoff rates from new development will not typically have remedial effects. They can, however, prevent aggravation of existing surcharging and related problems.

Skokie's stormwater ordinance provided a "safety factor" for the street storage system.

In designing the street storage system to prevent combined sewer surcharging, the ordinance allowed the assumption that any redevelopment in the community would be restricted by the two year criterion.

**Regulations of the Metropolitan Water Reclammation District of Greater Chicago**

The “Manual of Procedures for Administration of the Sewer Permit Ordinance” was adopted by the MWRDGC in 1970. Included are guidelines and criteria for the design of sewerage within the agency’s jurisdictional area. An MWRDGC permit is required for a sewer system to discharge to the agency’s system. The following provisions (quoted from Donohue, 1982a, pp. 28-29) related to CSS:

1. Complete separation of sewers shall be provided within the property lines.

2. Detention shall be provided and/or permanent constrictions shall be built on the stormwater sewer system to control flow into the existing combined system in accordance with the requirements of the local government.

3. All downspouts or roof drains shall be discharged onto the ground or be connected to storm or combined sewer.

4. Footing drains shall be connected to sump pumps and discharge shall be made into storm sewers, combined sewers, or drainage ditches.

5. Floor drains in basements shall be connected to sump pumps and discharged to sanitary or combined sewers.

6. Sump pumps shall be used for only one function, either to discharge stormwater or to discharge sanitary sewage. If both functions are used in one building, two pumps are required.

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